twenty-five years." His official correspondence with the Admiralty commenced in October, 1868; the early proceedings were reported to the House of Commons in July, 1869, and after much public discussion a statement on the general plan was made to the House in March, 1873. The collection of an efficient body of observers was then proceeded with, Colonel (then Captain) Tupman, R.M.A., who was one of the first to offer his services, taking an active part, on the recommendation of Sir George Airy, in the arrangements for the expeditions made under the authority of the Admiralty, and it may be stated here that since his return all the observers were placed under his superintendence at the Royal Observatory, for completing their special share in the reductions. He examined every step in the observers' computations, especially all that related to the adjustments of the instruments. "Never perhaps," says Sir George, "was such an enormous mass of calculations so severely criticised, and where necessary, repeated." In the latter part of 1880, the calculations with portions of introduction for each station, were handed over to Sir George Airy, by Captain Tupman, who was about to leave the country, and the remainder of the work was performed under the immediate guidance of the Astronomer-Royal, who states that it had occupied all the hours, not engaged on routine business, on which he could usually have reckoned for other matters of science.

The volume is divided into five parts, referring to as many expeditions for the observation of the transit, with an appendix. Part I. treats of the expedition to the Sandwich Islands, and the observations at Honolulu, Kailua, and Waimea; II. the expedition to Egypt (Mokattam Hills, near Cairo and Suez); III. that to Rodriguez, and the observations at Point Venus, Point Coton, and Hermitage Islet; IV. that to Kerguelen Island, and observations at Observatory Bay, Supply Bay, and Thumb Peak; and Part V. details operations in New Zealand. The observations and reductions in the expedition to the Sandwich Islands are printed at much length, but particulars relating to the other expeditions were presented on the scale which Sir George Airy had proposed in an address to the Royal Astronomical Society in March, 1875. It is hardly necessary to say that the actual observations of the transit are given *in extenso*, with full descriptions of the determinations of longitude, whether by telegraph, runs with chronometers, or lunar observations with the transit or alt-azimuth, to which last method Sir George Airy had called early attention, as one which it might be essential to apply in certain cases. The reduction of the observations is carried to the formation of the equations of condition, from which the parallax, &c., have to be determined. Sir G. Airy says he has "endeavoured to give the equations in the shape that will admit of combination in the easiest way for the computer's further operations—(whether he may desire to use the Calculus of Probabilities for the whole, or to make any special selection of combinations)—when he shall have decided on the recorded phase of contact of limbs which he thinks best to adopt."

The Appendix contains some tabular details and an account of photographic observations of the transit. The photographs are preserved at the Royal Observatory, and Sir G. Airy considers it possible that some astronomer may deem them worthy of rediscussion, though he does not anticipate that any great improvement can be made in measuring them.

This important volume, which extends to over 500 pages, is printed for Her Majesty's Stationery Office.

OUR BOOK SHELF

Worked Examination Questions in Plane Geometrical Drawing. By F. E. Hulme, F.L.S., F.S.A. (London: Longmans.)

THE Art Master at Marlborough College has gathered together in this book 300 problems, chiefly from papers set at the examinations for entrance to the military colleges. He gives fully worked out solutions to two-thirds of the questions, leaving the student to exercise himself unaided with the remainder. The figures embodying the solutions seem to have been very carefully prepared, and are clearly printed, and each plate is furnished with a blank fly-leaf, making reference easy.

A fair knowledge of geometry is assumed, but to certain of the questions notes are appended on special points as they arise, such as might not have been dealt with in the text-book or course that the student has worked through. These notes are very good, and not too long; the author's experience enabling him to anticipate difficulties and to give warning against pitfalls. Especially is the attention of the student drawn to constructions which, though they do not involve much head knowledge, yet require great care to ensure accuracy, and are thus severe tests of neatness and power in the use of instruments. In view of the growing importance of graphical methods of obtaining numerical results, the acquisition of this sort of hand-skill is becoming every day more desirable.

This book will be a welcome addition to the appliances of all teachers of the subject, for it will help to fill a wide gap; still the author might have made it more generally useful by a more judicious arrangement of his materials. The current text-books resemble treatises on arithmetic with very few examples: this volume furnishes an admirable collection of miscellaneous examples, but they are neither graduated nor classified; and they are too numerous for use by ordinary students *after* going through a systematic course of instruction in the subject. Teachers will know how to use the materials here provided whilst developing the subject, but their labour would be lightened, and the book made more serviceable for private students, by a classified table of contents or index to the problems. A. R. W.

Contributions to the History of the Development of the Human Race. By Lazarus Geiger. Translated from the second German edition by Daniel Asher, Ph.D. (Trübner and Co.)

THE firm of Trübner and Co. has done well in admitting this translation as a member of its *Philosophical Series*. The work is a thoughtful contribution by an able linguist to the science of anthropology as elucidated by the study of language. It is full of interesting facts and suggestive ideas concerning each of the following subjects, which form the headings of the six chapters of which the work consists:—The importance of language in the development of the race, the earliest history of the race as elucidated by language, the colour-sense of primitive times, the origin of writing, the discovery of fire, and the primitive home of the Indo-Europeans.

The Brain and its Functions. By J. Luys. International Scientific Series, vol. xxxvii. (London: Kegan Paul and Co., 1881.)

WE consider this a disappointing book, whether we regard it from a physiological or a psychological point of view.

It adds nothing, either to our previous knowledge of facts, or to our previous conceptions with regard to them, and so is of no use to scientific readers; while the manner in which it treats its subject is so dreary that we fear it is no less ill adapted to the requirements of popular readers. We regret this failure the more because the author, as is well known, is so hard a worker, both in cerebral morphology and morbid psychology, that in writing this book he deserved a success which he has failed to achieve. Having said this much it seems needless to enter on any detailed criticism. We have forced ourselves to read the work from end to end, but cannot advise any one else to follow our example.

Ideality in the Physical Science. By Benjamin Peirce. (Boston: Little, Brown and Co., 1881.)

THIS work is a series of six lectures published posthumously by the author's son. The lectures are of a purely popular character, and their object throughout is to maintain that science is, so to speak, an intellectual handmaiden to Christianity. The arguments, or rather illustrations, are all drawn from the domain of physics and astronomy, of which the writer was himself so distinguished a cultivator, and every page glows with the fervour of a deeply religious mind. Indeed, we may question whether there is not rather too much of this, even in view of the emotional effects which it seems to be the main object of the speaker to produce. The intellectual or argumentative object throughout is to show that the "ideality in the physical sciences" points to ideation in the source of the physical universe, or, to quote the concluding paragraph: "Judge the tree by its fruit. Is this magnificent display of ideality a human delusion, or is it a divine record? The heavens and the earth have spoken to declare the glory of God. It is not a tale told by an idiot, signifying nothing. It is the power of an infinite imagination, signifying IMMORTALITY."

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

Mr. Charles Darwin's Letters

WILL you allow me to mention that I am collecting my father's letters with a view to a biography. I shall be much obliged to any of my father's friends and correspondents who may have letters from him, if they will kindly allow me to see and make copies of them. I need hardly add that no letter shall be published without the full consent of its owner.

Down, Beckenham, May 25 FRANCIS DARWIN

Comet (*a*) 1882

THE following observations of Comet (*a*) 1882 have been made with the Transit-Circle of the Radcliffe Observatory, Oxford, when passing *sub-polo*:—

	1882.	G.M.T. h.	m.	s.	Observed R.A. h.	m.	s.	Observed N.P.D. (uncorrected for parallax). °	′	″	Observer.
(*a*)	May 12,	8	57	20·13	0	14	22·90	15	32	53·4	R.
(*b*)	13,	9	18	33·31	0	39	36·12	15	54	2·9	W.
(*c*)	15,	9	57	21·31	1	26	23·60	17	8	33·8	R.
(*d*)	16,	10	14	15·71	1	47	17·34	18	0	13·7	W.
(*e*)	17,	10	29	20·28	2	6	20·93	19	0	10·5	R.
(*f*)	18,	10	42	34·30	2	23	33·69	20	7	31·7	W.
(*g*)	19,	10	54	4·86	2	39	2·69	21	21	18·8	R.
(*h*)	20,	11	3	59·82	2	52	55·84	22	40	44·3	W.
(*i*)	21,	11	12	28	3	5	(22)	24	5	(18)	R.
(*k*)	22,	11	19	38·70	3	16	30·40	25	33	(54)	R.

Observers' notes:—

(*a*), (*b*) Very faint; but observations fair.

(*c*) Very faint at times; observation fair on the whole.

(*d*) Nucleus sometimes showed as a bright point, but generally not so well defined, and would scarcely stand any illumination of field. Observation, though difficult, very fair.

(*e*) Observation good.

(*f*) Observation considered very good. Nucleus very sharp at times.

(*g*) Difficult, but observation considered fairly good. Nucleus faint at times.

(*h*) Faint. Observation good.

(*i*) Observation only approximate. Sky cloudy.

(*k*) R.A. good. N.P.D. very rough, from a single bisection when extremely faint.

General Notes:—In the telescope, the light of the head on the night of May 18, the nucleus being better defined than on any other night when the observations were made by me, was certainly not brighter than an eighth magnitude star (W.).

Brightness = Eight in star-magnitude (R.).

Observers—W. = Mr. Wickham.
R. = Mr. Robinson.

E. J. STONE

Sea-shore Alluvion—Calshot and Hurst Beaches

WESTWARD of Brighton; Shoreham Harbour, Portsmouth, Southampton, and the Solent roadstead, all derive protection from shingle moles thrown up to windward of their entrances, the most remarkable of which, Calshot and Hurst Points, have each one of Henry VIII.'s stone castles at their extremities. The first incloses a large tidal estuary (Owers Lake) at the entrance to Southampton water, and forms a pier covering, the entrance to that fine natural harbour from the south-west.

The condition of this spit is not much altered since Leland's time, A.D. 1539; it terminates in a horn, which forms the lake, and the outfalls of the Beaulieu and Lymington Rivers westward have similar windward moles on a modified scale.

Hurst Point is two miles in length in a north-west and south east direction, formed of rounded siliceous pebbles on an argillaceous base, which last terminates in a nearly perpendicular submarine cliff 200 feet in height; this physical peculiarity of position has been described by Webster and other writers; it has for centuries acted as a breakwater to the Solent and the small natural harbours eastward of it on the Hampshire coast, but has also limited their capacity by promoting a rapid deposition of silt along their foreshores. In the storm of November, 1824, its position was, and remained for some time, considerably altered, as has been described by Lyell. Still, however, the maps in the Cottonian and Burleigh collections all show the peculiar horn-like termination due to the indraught into the Solent, and the general outline of the spit much as at present, which doubtless has preserved its main features for centuries, subject, however, to local disturbance and variation. Half a mile landward of the lighthouses the beach curves eastward, and forks into three or four gradations of "fulls," showing modern variations and additions to the extremity locally termed the "Point of the Deep," a quarter of a mile long, and running nearly at right angles to the main mole; two smaller spits called "Rabbit Point" and "Shooting Points" (a double formation), tail out from the main spit, within or landward of the extremity.

Parallel to the entrance to the Solent, a bank of shingle three to four miles in length, with about six feet water over it at low water of spring tides, varying in level with the weather, easterly winds banking it up, stretching from the extremity of Hurst Point, south-westward to opposite the ledge called the "Bridge," off the "Needles" rocks, leaves the small entrance channel (the "Needles" Channel) intervening.

Hurst Beach presents many characteristics peculiar to the Chesil, Calshot, and other similar formations such as a low, flat shore to leeward or eastward, and a highly-inclined beach seaward, with a tendency to curve round north-eastward, and ultimately to inclose a tidal mere or lake; the elevation and size of the pebbles increase towards the summit and termination, and in places patches of sand and shingle conglomerate of an early date crop out through the shifting modern "fulls."

The degradation of the cliffs to the westward has been very great, and they are much serrated and water-worn, with frequent slips in the upper strata of sand and gravel on a clay base, and